

Materials for the rust flora in Thailand I*

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Summary

This is a preliminary report on the rust flora in Thailand. Twenty-eight species among 6 genera (*Coleosporium*, *Hemileia*, *Olivea*, *Phakopsora*, *Puccinia*, and *Uromyces*) are reported.

Some rust fungi were listed as the pathogens of economic plants in Thailand (Giatgong, 1980). However, there are no articles on rust flora nor lists which indicate their collection and their deposition in authentic herbaria.

We collected and studied many rust fungi in Thailand in 1981 and 1982. The rust specimens deposited in the herbaria of the Department of Plant Pathology, Kasetsart University; the Department of Plant Pathology, Chiang Mai University; and the Mycology Branch, Plant Pathology and Microbiology Division, Department of Agriculture, Ministry of Agriculture and Cooperatives, were available for our study. In this paper, we report 28 species of *Coleosporium*, *Hemileia*, *Olivea*, *Phakopsora*, *Puccinia*, and *Uromyces*. The Roman numerals 0, I, II, and III denote respectively spermogonial, aecial, uredinal and telial stages of rust fungi. C. L., N. V., and M. K. in the enumerations of collections are abbreviations of Chaisaeng Lorsuwan, Nippon Visarathanonth, and Makoto Kakishima, respectively. All the materials studied have been deposited either in the Herbarium of the Mycology Branch (MHMB) or the Herbarium of the Institute of Agriculture and Forestry, University of Tsukuba (TS), or in both.

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Enumeration of species

1. *Coleosporium plectranthi* Barclay on *Plectranthus* sp.; Mt. Doisuthep, Chieng Mai Prov. (II, Jan. 16, 1982, M. K., TS-R7001).

Urediniospores of this rust agreed well morphologically with those of *C. plectranthi* (Kaneko, 1982).

2. *Hemileia vastatrix* Berk. et Br. on *Coffea robusta* Linden; Chumphon Prov. (II, Oct. 1977, C. L., MHMB no. 352, TS-R7004); Batong, Yala Prov. (II, Oct. 1977, C. L., MHMB no. 357, TS-R7005). on *Coffea arabica* L.; Chiankien High Hill Exp. Sta., Chieng Mai Prov. (II, Jan. 16, 1982, M. K., TS-R7006, Figs. 1, 2). on *Coffea* sp.; Yala Prov. (II, Nov. 1977, C. L., MHMB no. 249, TS-R7007). on *Coffea* sp.; Bangbo, Panggana Prov. (II, July 1977, MHMB no. 243, TS-R7008).

The surface of the flat side of urediniospores is smooth while that of the convex side is aculeate (Fig. 2).

3. *Olivea tectonae* (T. S. et K. Ramakrishnan) Mulder on *Tectona grandis* L.; Saraburi Botanical Garden, Saraburi Prov. (II, Dec. 21, 1981, C. L. and M. K., TS-R7009, Fig. 3).

This species is widely distributed in the tropical regions of Asia (Ono, 1978; Holliday, 1980).

4. *Phakopsora ampelopsidis* Diet. et P. Syd. on *Vitis* sp.; Bangkok, Bangkok (II, Aug. 21, 1981, N. V., no. 11, TS-R7010). on *Vitis* sp.; Nakorn Pathom Prov. (II, Feb. 1979, MHMB no. 313, TS-R7011). on *Vitis* sp.; Nakorn Pathom Prov. (II, June 1976, MHMB no. 169, TS-R7012).

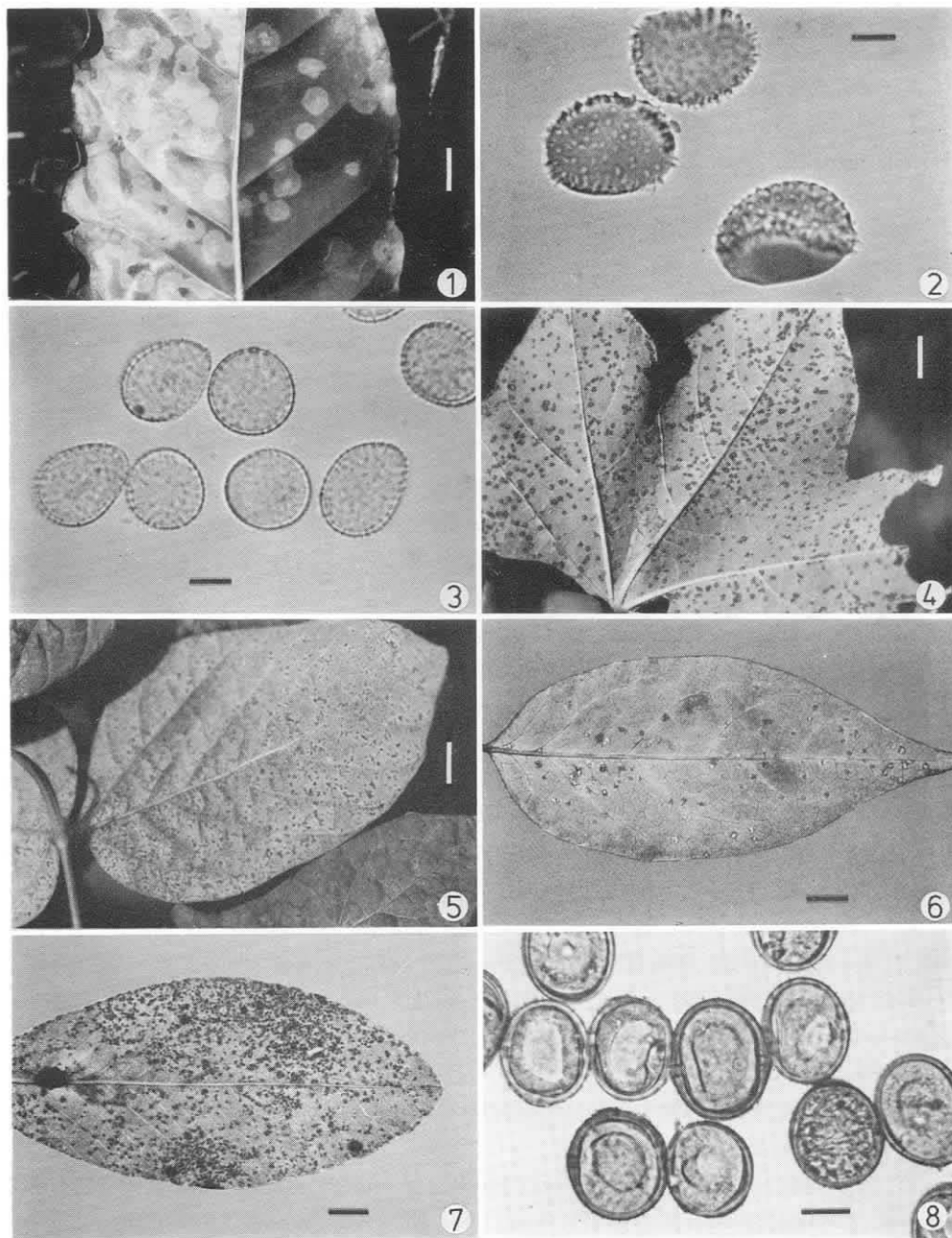
5. *Phakopsora gossypii* (Arthur) Hiratsuka, f. on *Gossypium* sp.; Agr. Exp. Sta. of Department of Agriculture, Koktoom, Lopburi Prov. (II, Dec. 16, 1981, M. K., TS-R7013, Fig. 4).

6. *Phakopsora pachyrhizi* P. et H. Syd. on *Pachyrhizus erosus* L.; Kampaengsan, Nakorn Pathom Prov. (II, Dec. 1981, N. V., no. 12, TS-R7014). on *Glycine max* (L.) Merr.; Agr. Exp. Sta. of Department of Agriculture, Koktoom, Lopburi Prov. (II, Oct. 28, 1981, M. K., TS-R7002); Maejoe Agr. Exp. Sta, Chieng Mai Prov. (II, Jan. 18, 1982, C. L. and M. K., TS-R7015, Fig. 5); Nakorn Sawan Prov. (II, Oct. 1974, MHMB no. 84, TS-R7016); Sukhothai Prov. (II, Oct. 1975, MHMB no. 218, TS-R7017).

7. *Phakopsora phyllanthi* Diet. on *Phyllanthus acidus* (L.) Skeels; Nakorn Pathom Prov. (II, Dec. 2, 1981, N. V., no. 6, TS-R7018; II, June 1977, C. L., MHMB no. 343 TS-R7019); Chieng Mai Prov. (II, Jan. 17, 1982, M. K., TS-R7020, Fig. 6).

This fungus is widely distributed in South Asia (Arthur and Cummins, 1936b; Boedijn, 1959; Butler and Bisby, 1960; Yen, 1969).

8. *Phakopsora zizyphi-vulgaris* (P. Henn.) Diet. on *Zizyphus jujuba* Lam.; Nakorn Pathom Prov. (II, III, Dec. 24, 1981, N. V., no. 5, TS-R7021).

Fig. 1. Uredinia of *Hemileia vastatrix* on *Coffea robusta*.Fig. 3. Urediniospores of *Olivea tectonae*.Fig. 4. Uredinia of *Phakopsora gossypii* on *Gossypium* sp.Fig. 5. Uredinia of *Phakopsora pachyrhizi* on *Glycine max*.Fig. 6. Uredinia of *Phakopsora phyllanthi* on *Phyllanthus acidus*.Fig. 7. Uredinia of *Puccinia arachidis* on *Arachis hypogea*.Fig. 8. Urediniospores of *P. arachidis*.Fig. 2. Urediniospores of *H. vastatrix*.(Scales: 1 cm for 1, 4, 5, 6, 7; 10 μ m for 2, 3, 8)

On *Z. jujuba*, *Crossopora zizyphi* (Syd. et Butl.) Syd.; also reported in Indonesia and India (Boedijn, 1959; Burtle and Bisby, 1960).

9. *Puccinia arachidis* Speg. on *Arachis hypogea* L.; Kalasin Agr. Exp. Sta., Kalasin Prov. (II, Aug. 1978, MHMB no. 263, TS-R7022); Chainat Prov. (II, Oct. 28, 1975, MHMB no. 133, TS-R7023); Agr. Exp. Sta. of Department of Agriculture, Koktoom, Lopburi Prov. (II, Dec. 16, 1981, M. K., TS-R7024, Figs. 7, 8).

10. *Puccinia congesta* Berk. et Br. on *Polygonum* sp.; Mt. Doisuthep, Chieng Mai Prov. (III, Jan. 16, 1982, M. K., TS-R7025, Figs. 9, 10).

This is microcyclic species distributed in Asia and South America (Hiratsuka, 1976).

11. *Puccinia cynodontis* Lacroix ex Desm. on *Cynodon* sp.; Chieng Mai Univ. Farm, Chieng Mai Prov. (II, Jan. 18, 1982, C. L. and M. K., TS-R7026, Fig. 11). on *Cynodon* sp.; Maejoe Agr. Exp. Sta., Chieng Mai Prov. (II, Jan. 18, 1982, C. L. and M. K., TS-R7027).

Urediniospore wall of this species is verrucose (Cummins, 1971).

12. *Puccinia duthiae* Ell. et Tracy on *Dichanthium annulatum* Stapf.; Agr. Exp. Sta. of Department of Agriculture, Koktoom, Lopburi Prov. (II, III, Dec. 16, 1981, M. K., TS-R7028, Fig. 12; II, III, Dec. 28, 1981, M. K., TS-R7029).

13. *Puccinia helianthi* Schw. on *Helianthus annuus* L.; Bangkhen, Bangkok (II, Aug. 8, 1974, MHMB no. 66, TS-R7034, Figs. 13, 14).

14. *Puccinia hemerocallidis* Thümen on *Hemerocallis flava* L.; Chieng Mai Prov. (II, III, Dec. 24, 1981, N. V., no. 3, TS-R7030). on *Hemerocallis* sp.; Chieng Mai Univ., Chieng Mai Prov. (II, Jan. 18, 1982, C. L. and M. K., TS-R7031, Fig. 15). on *Hemerocallis* sp.; Chiankien High Hill Exp. Sta., Chieng Mai Prov. (II, Nov. 1980, C. L., MHMB no. 224, TS-R7032). on *Hemerocallis* sp.; Khon Kaen, Nam Prov. (II, June 1976, MHMB no. 173, TS-R7033).

15. *Puccinia heterospora* Berk. et Curt. on *Abutilon* sp.; Konipan Prov. (III, Oct. 1980, C. L., MHMB no. 369, TS-R7035, Figs. 17, 18).

Teliospores of this species are mostly one-celled but a few spores with a transverse septum are seen (Fig. 18). This species is distributed in tropical and sub-tropical regions (Hiratsuka, 1976).

16. *Puccinia mentae* Pers. on unidentified plant of Labiatae; Chieng Mai Prov. (II, III, R. Black, TS-R7036).

17. *Puccinia nakanishikii* Diet. on *Cymbopogon citratus* Stapf.; Chiankien High Hill Exp. Sta., Chieng Mai Prov. (II, III, Aug. 1976, MHMB no. 188, TS-R7037).

18. *Puccinia philippinensis* P. et H. Syd. on *Cyperus rotundus* L.; Agr. Exp. Sta. of Department of Agriculture, Koktoom, Lopburi Prov. (II, III, Dec. 16, 1981, M. K., TS-R7039, Fig. 16); Maejoe Agr. Exp. Sta., Chieng Mai Prov. (II, III, Jan. 18, 1982, C. L. and M. K., TS-R7040); Chieng Mai Prov. (II, III, Jan. 17, 1982, M. K., TS-R7041); Nonthaburi Prov. (II, III, Aug. 1979, C. L. MHMB no. 386, TS-R7042);

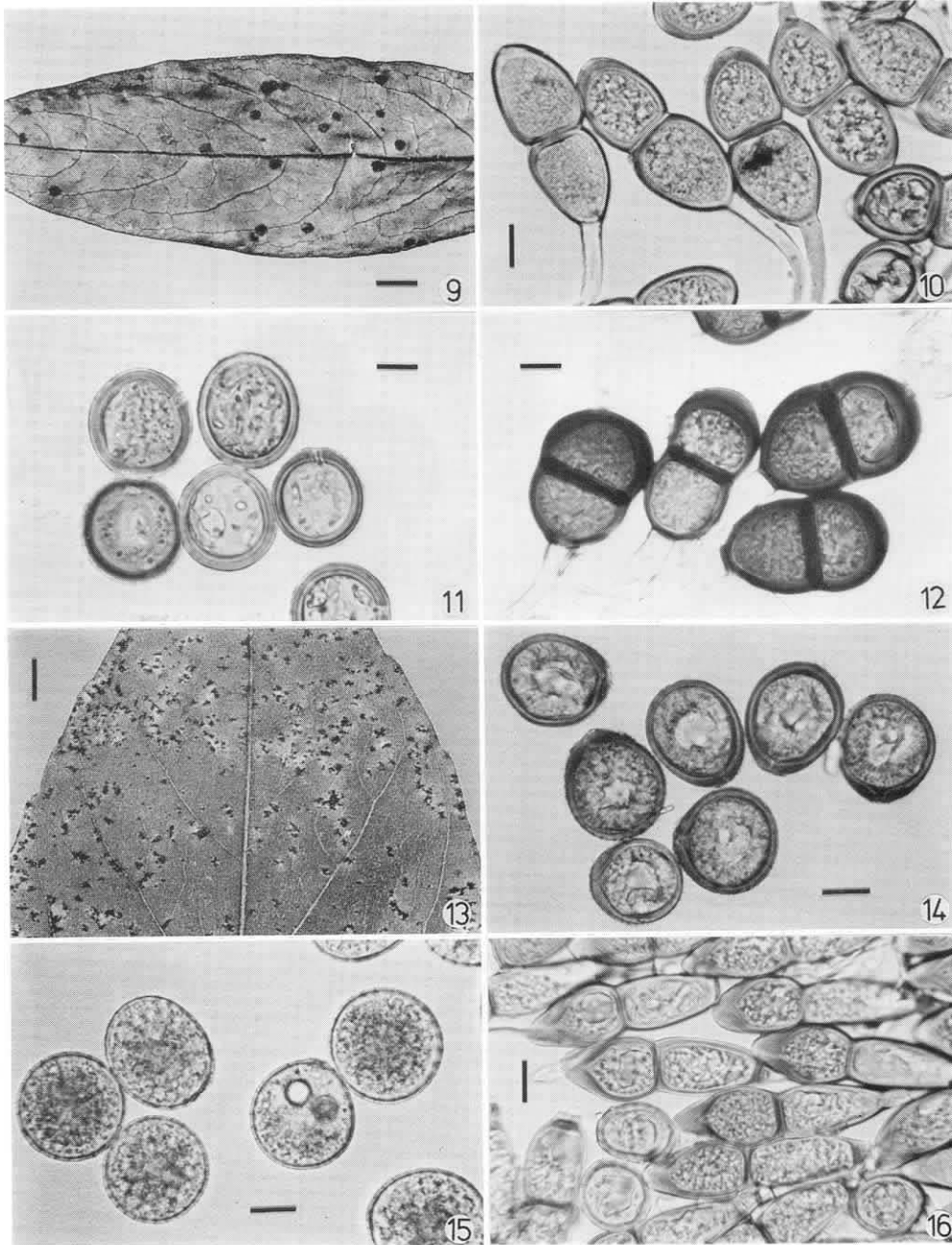


Fig. 9. Telia of *Puccinia congesta* on *Polygonum* sp.

Fig. 11. Urediniospores of *Puccinia cynodontis*.

Fig. 13. Uredinia of *Puccinia helianthi* on *Helianthus annuus*.

Fig. 15. Urediniospores of *Puccinia hemerocallidis*.

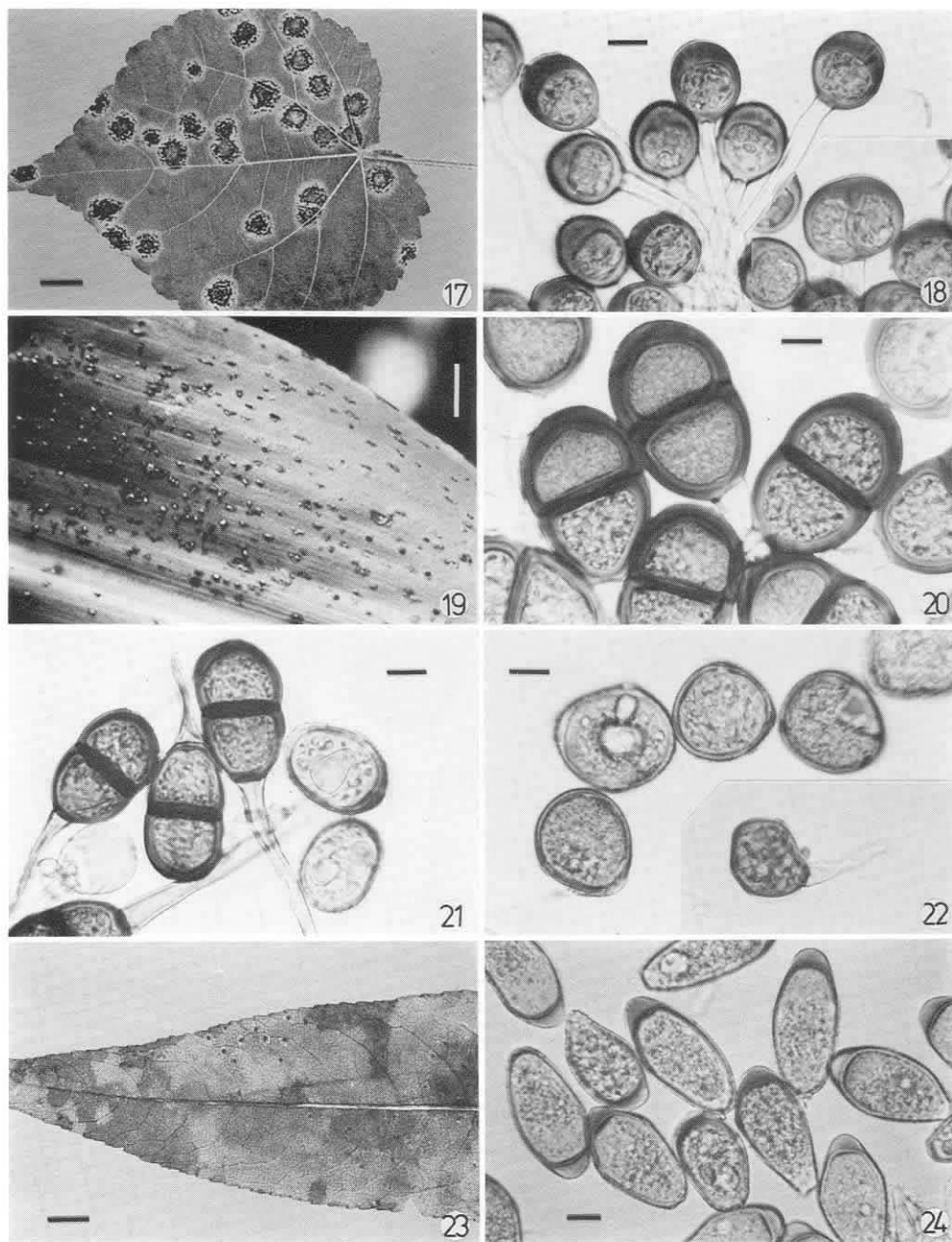
Fig. 16. Urediniospores and teliospores of *Puccinia philippinensis*.

(Scales: 1 cm for 9, 13; 10 μ m for 10, 11, 12, 14, 15, 16)

Fig. 10. Teliospores of *P. congesta*.

Fig. 12. Teliospores of *Puccinia duthiae*.

Fig. 14. Urediniospores of *P. helianthi*.

Fig. 17. Telia of *Puccinia heterospora* on *Abutilon* sp.Fig. 19. Uredinia and telia of *Puccinia purpurea* on *Sorghum vulgare*.Fig. 21. Urediniospores and teliospores of *Puccinia ruftipes*.Fig. 22. Urediniospores and a teliospore of *Uromyces setariae-italicae*.Fig. 23. Uredinia of *Tranzschelia pruni-spinosae* on *Prunus* sp.Fig. 24. Urediniospores of *T. pruni-spinosae*.Fig. 18. Teliospores of *P. heterospora*.Fig. 20. Teliospores of *P. purpurea*.(Scales: 1 cm for 17, 19, 23; 10 μ m for 18, 20, 21, 22, 24)

Nakhon Pathom Prov. (II, III, Dec. 1981, N. V., no. 4, TS-R7043).

This species is widely distributed in Asia (Arthur and Cummins, 1936a; Teodoro, 1937; Ahmad, 1956; Boedijn, 1959; Hiratsuka, 1960; Yen, 1969; Tai, 1979).

19. *Puccinia purpurea* Cooke on *Sorghum vulgare* L.; Agr. Exp. Sta. of Department of Agriculture, Koktoom, Lopburi Prov. (II, III, Dec. 16, 1981, M. K., TS-R7044); Nakorn Sawan Prov. (II, III, Oct. 16, 1974, MHMB no. 119, TS-R7045); Koktoom, Lopburi Prov. (II, III, Dec. 10, 1981, M. K., TS-R7046, Figs. 19, 20).

20. *Puccinia recondita* Rob. ex Desm. on *Triticum aestivum* L.; Chieng Mai Univ. Farm, Chieng Mai Prov. (II, Nov. 3, 1981, R. Black, TS-R7047).

21. *Puccinia rufipes* Diet. on *Imperata cylindrica* Beauv.; Maejoe Agr. Exp. Sta., Chieng Mai Prov. (II, III, Jan. 17, 1982, C. L. and M. K., TS-R7048, Fig. 21).

22. *Puccinia scirpi* DC. on *Schoenoplectus validus* (Vahl) Löve et Löve (= *Scirpus validus* Vahl); Chieng Rai Prov. (II, Sept. 1980, C. L., TS-R7049).

Urediniospores of this species have 2 equatorial germ pores.

23. *Puccinia sorghi* Schw. on *Zea mays* L.; Bangkhen, Bangkok (II, Dec. 17, 1981, N. V., no. 8, TS-R7050); Chieng Mai Prov. (II, III, July 8, 1981, R. Black, TS-R7051).

24. *Tranzschelia pruni-spinosae* (Pers.) Diet. on *Prunus persica* (L.) Batsch; Chieng Mai Prov. (II, Dec. 24, 1981, N. V., no. 2, TS-R7054). on *Prunus* sp.; Chiankien High Hill Exp. Sta., Chieng Mai Prov. (II, Jan. 16, 1982, M. K., TS-R7055, Figs. 23, 24).

We identified this rust as *T. pruni-spinosae* because of its characteristic urediniospores with thickened walls at the apex (Fig. 24).

25. *Uromyces acori* Ramakrishnan et Rangaswami on *Acorus clamus* L.; Rajaburi Prov. (II, III, June 1977, C. L., MHMB no. 344, TS-R7056; II, III, March 1977, C. L., MHMB no. 288, TS-R7058).

This species is distributed in Asia (Hiratsuka, 1973).

26. *Uromyces coronatus* Miyabe et Nishida ex Diet. on *Zizania latifolia* Turcz.; Chieng Mai Prov. (II, Aug. 1976, C. L., MHMB no. 231, TS-R7059).

27. *Uromyces setariae-italicae* Yoshino on *Panicum* sp.; Maejoe Agr. Exp. Sta., Chieng Mai Prov. (II, III, Jan. 18, 1982, C. L. and M. K., TS-R7065, Fig. 22).

28. *Uromyces viciae-fabae* (Pers.) Schröt. var. *viciae-fabae* on *Pisum sativum* L.; Maejoe Agr. Exp. Sta., Chieng Mai Prov. (0, I, Feb. 1977, MHMB no. 275, TS-R7066; 0, I, Feb. 1979, MHMB no. 312, TS-R7067).

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摘 要

タイ国産銹菌資料 I

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タイ国産銹菌類28種 (*Coleosporium*, *Hemileia*, *Olivea*, *Phakopsora*, *Puccinia* および *Uromyces* の6属) を報告する. これはタイ国産銹菌フロラに関する最初の資料である.